DOCUMENT RESUME

ED 072 247 VT 018 700

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TITLE	A Follow-Up Study of the 1962-1966 James Wood High School Industrial Cooperative Training Program.
PUB DATE	Dec 69
NOTE	74p.; M.S. Thesis, Virginia Polytechnic Inst., Blacksburg
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Cooperative Education; Educational Research; Employment; Employment Patterns; *Followup Studies; *Graduate Surveys; *Occupational Mobility; Occupational Surveys; Persistence; Program Effectiveness; Program Evaluation; *Vocational Education
IDENTIFIERS	James Wood High School

ABSTRACT

In this descriptive followup study, which was designed to determine the relationship of test scores and training-related variables to occupational persistence, questionnaires were mailed to 80 former students and personnel folders from the training program were examined. A multiple regression and correlation analysis was used to analyze the relationship of occupational persistence and: (1) test scores from the Kuder Interest Test, the Differential Aptitude Test, and the General Aptitude Test Battery, (2) students' employer ratings, (3) daily work reports, and (4) classroom study records. A significant result of this study was that 73 percent of the civilian graduates were working in related occupations 3 to 6 years following graduation. The correlations of the test scores and training related variables to the criterion variable (occupational persistence) were low, and the relatively small amount of variance in the criterion did not imply precise relationships. However, this study seems to indicate that it may be possible to describe certain characteristics of industrial cooperative students and their training that are related to occupational persistence. (Author/SB)

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ED 072247

A FOLLOW-UP STUDY OF THE 1962-1966 JAMES WOOD HIGH SCHOOL INDUSTRIAL COOPERATIVE TRAINING PROGRAM

by

Glenn O. Workman

Thesis submitted to the Graduate Faculty of the
Virginia Polytechnic Institute
in partial fulfillment for the degree of
MASTER OF SCIENCE

in

Education

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December 1969

Blacksburg, Virginia

VT018700

A FOLLOW-UP STUDY OF THE 1962-1966 JAMES WOOD HIGH SCHOOL INDUSTRIAL COOPERATIVE TRAINING PROGRAM

GLENN OLIVER WORKMAN

ABSTRACT

Purpose. The purpose of the study was to make a descriptive follow-up of the 1962-1966 James Wood High School industrial cooperative training program, and to determine the relationship of test scores and training related variables to occupational persistence.

Summary. A ninety-five percent return was achieved for the follow-up questionnaire designed to collect descriptive data from eighty, former students. A multiple regression and correlation analysis was used to analyze the relationship of occupational persistence and test scores that included the Kuder Interest Test, the Differential Aptitude Test and the General Aptitude Test Battery. Data summarized from the students' employer ratings, daily work reports and classroom study records were also used to determine occupational persistence. An IBM 7090 Computer and a Biomedical (BIMD 29) computer program were employed to process the data.

Conclusions. The 1962-1966 James Wood High School industrial cooperative training program provided training that was valuable to later job success. The results of the study support a curriculum that gives emphasis to on-the-job training first, directly related study second, indirectly related study third, generally related lessons and counseling fourth, and club activities last.

The study tends to indicate that it may be possible to describe certain characteristics of industrial cooperative training students, and of the training they received that are related to persistence in the occupations for which the students were trained.

ACKNOWLEDGEMENT

The writer is grateful for the assistance and direction of his Graduate Committee Chairman, Dr. Larry J. Weber, Assistant Professor of Education, Virginia Polytechnic Institute and to Dr. Charles E. King, Coordinator of Research, Fairfax County Public Schools.

The writer further acknowledges the contributory services of Mr. Howard McVicker, Assistant Professor at Purdue University; Mr. John W. Lombard, Director, Guidance Department, Science Research Associates, Inc.; Mr. Wilson Dickson, Winchester Office of The Virginia Employment Commission; Mrs. Edna Fetter, Guidance Director at James Wood High School; and Mr. James C. Gordon, Principal at James Wood High School.

The writer is especially grateful to the seventy-six student-learners for completing the lengthy questionnaires, and for their comments.

Needless to say, the writer cannot adequately convey his thanks for a tolerant wife who provided him with a future President, Jeremy Workman, during the writing of this thesis.

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CHAPTER I

INTRODUCTION

Industrial Cooperative Training is an on-the-job, trade and technical training program for high school juniors and seniors. In Virginia it is known as I.C.T., but in other states it may be called by such titles as Diversified Occupations (D.O.) or Diversified Cooperative Education. There are aspects of industrial cooperative training that make it somewhat similar to other educational programs such as the distributive education sales and marketing program, the vocational office training secretarial program, the apprenticeship program or to the manpower development training program. Industrial cooperative training is often grouped as a work-experience program or even as a work-study program, but it is more than work; it is occupational preparation for employment in gainful, trade and technical occupations.

I. STATEMENT OF THE PROBLEM

The purpose of the study was to make a descriptive, follow-up study of the 1962-1966 James Wood High School Industrial Cooperative Training Program, and to determine the relationship of test scores and training related variables to persistence in occupational job placements (see pages 33-36 for list of variables).

Specific Questions to be Answered

The purpose of the study was to seek answers to the following questions:

1. What was the status of the graduates and non-graduates three to six years after termination of their training?

2. What was the relationship of interest and aptitude test scores and such training related characteristics as employer ratings, self-study effort, on-the-job training, and final grades in industrial cooperative training to occupational persistence as measured by the number of months that students have remained in the occupation for which they were trained?

II. SIGNIFICANCE OF THE PROBLEM

State and federal follow-up reports, showing the employment status of industrial cooperative training students upon graduation from high school, have been made for periods of time ranging from one to five months. Statistical evidence is needed for longer periods of time in order to forcefully describe the effectiveness of the industrial cooperative training curriculum to complement the post-training status of former students. This follow-up study of the 1962-1966 James Wood High School Industrial Cooperative Training Program was made three to six years after students had terminated their training.

A proper follow-up study should also concern itself with the status of students who have failed or withdrawn from the training program. Most follow-up studies in the related literature seem primarily concerned with students who have graduated from industrial cooperative training. This follow-up study described the status of the non-graduates as well as the graduates.

Statistical analysis of the vast amount of data collected in the operation and follow-up of industrial cooperative training programs

needs to be made in order to devise methods of predicting occupational persistence. Data should be collected on the kinds of studies taking place in the classroom, the training being received on the job, and the testing instruments used to guide students into appropriate occupations. This study made a correlation analysis of the interest and aptitude test scores and training related data collected in the operation of the James Wood High School Industrial Cooperative Training Program.

Signficance of the Test Data

The Differential Aptitude Test Manual indicated that interests and aptitude tests should be administered before, not after, students have achieved success in particular occupations.[1] In order to validate the relationship between interest and aptitude scores and later persistence in occupations, research studies of industrial cooperative training programs need to use the interest and aptitude scores made by students before they were placed in the occupations. The Kuder Preference Record, Vocational, Form C tests reported in this study were administered before the students were placed in jobs in the eleventh and twelfth grades; the General Aptitude Test Battery, Adult Form A was given during the time they were enrolled in the twelfth grade, and the Differential Aptitude Tests, Form A were administered in the eighth grade. A unique feature of this problem

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[1] George K. Bennett, Harold G. Seashore, and Alexander G. Wesman, Differential Aptitude Tests (New York: The Psychological Corporation, 1966), Chapt. V, p. 39.

was that all tests were given before the students were placed in jobs.

III. PURPOSES OF THE STUDY

This study was a follow-up of the 1962-1966 James Wood High School Industrial Cooperative Training Program. The purpose of the study was to report the status of the former students and to present evidence of the effectiveness of the present I.C.T. curriculum.

An additional purpose of this study was to determine the relationship of test scores and training related data to occupational persistence. If this relationship could be demonstrated, occupational persistence could be increased by emphasizing certain curricular aspects of the program.

IV. ASSUMPTIONS AND LIMITATIONS

The writer assumed that the answers given on the follow-up questionnaires were true descriptions of the status of the students, and that the answers obtained by the questionnaires represented the value of the training the students received.

The writer recognized that the distinction between what was directly related study and what was indirectly related study was sometimes difficult for students to make, but the writer assumed that the students made a reasonable distinction on the self-study effort reports.

The writer assumed that an occupational family of mechanical and building trades occupations require similar aptitudes and interests. This occupational family was determined from a review of job duties and occupational definitions found in the Dictionary of Occupational

Titles[2] and from a review of the aptitude pattern structures found in the Manual for the General Aptitude Test Battery Section II: Norms.[3]

The writer assumed that the criterion, occupational persistence, was continuous and normally distributed in the sample of mechanical and building trades occupations.

V. DEFINITION OF TERMS

The terms used throughout this study are defined as follows:

Employer Rating

A subjective, on-the-job rating of nine attributes: appearance, promptness, cooperation, safety, interest in work, interest in firm, rate of work, quality of work and progress. The ratings were made by checking one of three judgments, good, satisfactory and poor for each attribute.

Self-study Effort Report

A record kept by each student which lists the quantity of reading, assignments completed and references used in directly related and indirectly related studies for each grading period. This report attempted to measure the amount of effort or motivation the I.C.T. student put forth. It is a measure of self-instruction by students during this part of their classroom time.

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[2]U.S. Dept. of Labor, Dictionary of Occupational Titles, Definitions of Titles Volume I (Washington: U.S. Government Printing Office, 1965).

[3]U.S. Dept. of Labor, Manual for the General Aptitude Test Battery Section II: Norms Occupational Aptitude Pattern Structure (Washington: U.S. Government Printing Office, 1968).

Daily Work Report

A record kept by each student to indicate the quantity of on-the-job experiences as measured by hours engaged during each on-the-job experience. Daily, weekly and monthly totals and hourly rate of pay were reported.

Directly Related Studies

The self-taught, technical knowledge needed to perform manipulative skills efficiently and effectively. It consists of knowledge directly related to the tasks performed on-the-job and acquired by studying printed information. Example: Machinists studied machine shop performance skills.

Indirectly Related Studies

The technical and auxiliary, printed information that is useful but not essential to the performance of manipulative, on-the-job tasks, ". . . but the possession of which creates confidence and job pride in a person and enables him to work with a greater degree of intelligence and satisfaction."[4] In this particular I.C.T. program, such indirectly related information was provided in the areas of mathematics, chemistry, and physics as it related to the student's occupation. For example, the study of gasoline fuel chemistry was indirectly related study for auto mechanics.

Trade and Technical Occupations

A craft or skilled occupation not normally classified as wholely sales, office, agricultural or domestic.

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[4]C.E. Rakestraw, Training High-School Youth for Employment (Chicago, Illinois: American Technical Society, 1951), p. 77.

Family of Mechanical and Building Trades Occupations

A group of occupations which require similar aptitudes and interests. For the purpose of the study, such aptitudes and interests were thought to be mechanical and manipulative in nature.

Related On-the-job, Occupational Experiences

Work experience that is legitimate, skilled training associated with the student's occupational goal.

Non-Related On-the-Job, Occupational Experiences

Work experience that is not related to the occupation for which training is being sought.

Occupational Persistence

The number of months of continuous employment of a given student in the occupation for which he was trained. This period included time before and/or after military service, but excluded the time spent in the military service itself.[5]

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[5]Occupational persistence was limited to a maximum of thirty-three months duration in order to equalize the opportunity for persistence in occupations by the group, which consisted of four classes.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

Follow-up studies of I.C.T. programs and studies of the prediction of success in occupational training programs were reviewed in an attempt to find a relevant criterion and to determine a statistical method that would be applicable to the prediction of occupational persistence.

I. LITERATURE ON FOLLOW-UP STUDIES AND REPORTS

Follow-up reports were found for the graduates from Diversified Occupations Programs (now Industrial Cooperative Training) for the Southern Region of the United States from the beginning year of Diversified Occupations in 1933.[1] Cumulative data for graduates of Diversified Occupations Programs were reported in the following categories:

1. The number and percentage employed in occupations for which training was given.

2. The number and percentage employed in occupations allied to the training received.

3. The number and percentage in other occupations for which training was an asset.

4. The total number and percentage employed.

5. The number and percentage continuing in school.

6. The number and percentage in the armed forces.

The number and percentage in a category known as other included students who were physically unable or who did not desire to work, girls who had

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[1] Rakestraw, op. cit., pp. 173-178.

married and those for whom no information was available, and the number and percentage of total graduates.[2]

Follow-up reports were located for persons completing preparatory vocational education programs in all areas of the United States that were operating programs established by such national vocational education acts as the Smith-Hughes Act of 1917, the George-Dean Act of 1936, the George-Barden Act of 1946 and others. National follow-up reports were reported by including Industrial Cooperative Training in a Trades and Industry category.

Most national follow-up reports indicated that seventy to eighty percent of the graduates of all secondary, preparatory vocational education programs were employed in jobs related to the training they received.[3] These reports were usually based on data collected for periods of time ranging from one to four months following student graduation. The categorical tabulation of data for the national follow-up reports were similar to those described previously in this chapter (see page 8).

The review of additional follow-up studies for individual Industrial Cooperative Training programs indicated that the relationship of training to entry and persistence in a related occupation was a major problem area. Entry and persistence in occupations related to the occupations for which students were trained were usually used to indicate

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[2]Rakestraw, loc. cit.

[3]U.S. Office of Education, Division of Vocational and Technical Education Vocational and Technical Education Annual Report, Fiscal Year 1967 (Washington: U.S. Government Printing Office, 1969).

the success of the Industrial Cooperative Training programs. In a follow-up study by Keyes, a return of 63% of his questionnaires revealed the following results: 49% of the former students were employed full-time as a result of their training in Diver .ied Occupations; 7% did not graduate from high school; 85% remained in the local community; 16% reported that the training was of great value in their present jobs; 6% reported that the training they received was of no value; and 53% had taken further training.[4]

A follow-up study by Brown reported that 39% of the graduates in his Diversified Occupations study were employed in the occupation for which they were trained, and 14% were in related occupations.[5] This meant that a total of 53% of the graduates were in the same occupation or in an occupation related to the occupations for which they were trained.[6]

Goins found that 69% of the students who entered full-time employment remained in the local community.[7] Peden found that 79% of the Diversified Cooperative Education students in his study remained in

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[4]United States Department of Health Education and Welfare, Office of Education, Vocational Division, Research in Industrial Education Summaries of Studies 1930-1955, No. 3649, p. 504 (Washington: Government Printing Office, 1957).

[5]United States Department of Health Education and Welfare, Office of Education, Vocational Division, Research in Industrial Education Summaries of Studies 1956-1959, No. 293, p. 113 (Washington: Government Printing Office, 1961).

[6]Ibid.

[7]Joe Clyde Goins "The Part-time Cooperative Program In Diversified Occupations In Campbell County, Tennessee" Research in Industrial Education 1930-1955, No. 3609, p. 499.

the local community, and that 70% of the graduates were still employed in the same and related occupations for which they were trained.[8]

A group of Indiana I.C.T. coordinators found that 47% of former I.C.T. graduates were employed in the same or highly related occupations.[9] Only 33% of the former students indicated on the Indiana questionnaire that there was no relationship between the training they received and post-I.C.T. employment. 77% of the population involved in the Indiana study were satisfied with their post-I.C.T. employment.

II. LITERATURE ON THE PREDICTION OF SUCCESS CRITERIA

Many studies have predicted criteria of high school and college success through the use of correlation and multiple regression methods. A few studies have used correlation methods to predict success in vocational courses. Prediger, Waple and Nusbaum found evidence of differential prediction using aptitude tests to indicate success in high school vocational programs.[10] Prediger, Waple and Nusbaum were not able to predict for auto mechanics, carpentry and electricity courses. These occupational areas were relevant to the study undertaken by this writer. Pucel used regression techniques to determine if descriptive personal data, General Aptitude Test Battery scores, and in-school instructor

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[8]William Peden Follow-up Study of Former Diversified Cooperative Education Students, Unpublished, Purdue University, 1967.

[9]Howard McVicker The Development of a Follow-up Questionnaire for Industrial Cooperative Training, Unpublished, Purdue University, 1968.

[10]Dale J. Prediger, Charles C. Waple and Gerald R. Nusbaum "Predictors Of Success In High School Level Vocational Education Programs: A Review, 1945-1967" Personnel And Guidance Journal, October, 1968, pp. 137-145.

ratings of trainees in Manpower Training (MDTA) could be used to predict post-training employment data (success criteria).[11]

Pucel obtained a .69 multiple regression coefficient for forty-eight trainees classified in skilled occupations consisting of diesel mechanics, electrical mechanics and welders.[12] His rank order of variables having the most predictive efficiency in order of the amount of variance accounted for by each included the clerical perception and numerical aptitude tests of the General Aptitude Test Battery.[13] However, neither test had a significant zero-order correlation at the .05 level.[14] An additional equation was derived by Pucel to determine the relationship of teacher ratings of attitudes and achievement with post-training success.[15] Pucel found the following attitudes and achievements to be the most efficient predictors of the post-training success of trainees working in skilled occupations:[16]

1. Discipline
2. Achievement in the program
3. Skill when trainee left the program
4. Confidence when trainee entered the program
5. Technical knowledge when trainee left the program
6. Confidence when trainee left the program

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[11] David J. Pucel Variables Related to MDTA Trainee Employment Success In Minnesota (Washington: U.S. Office of Education, February 1968).

[12] Ibid., pp. 3, 13.

[13] Ibid., p. 14.

[14] Ibid.

[15] Ibid., p. 15.

[16] Ibid., p. 16.

These ratings of attidues and achievement were used in the multiple regression equation with an R = .81 which was significant at the .01 level.[17]

Validity studies of job success reported in the Manual for the General Aptitude Test Battery have shown that "Training criteria such as school grades, instructors' ratings, etc., tended to yield slightly higher validity in USES studies than job proficiency criteria (production records, supervisory ratings, etc.)."[18]

Most research findings indicated that prior school achievement was related to later vocational course achievement, and that aptitudes, interests and motivation appeared to be related to vocational course completion.[19] Interests as measured by the Kuder Preference Record were relevant to entry into skilled trades, but interests were negatively related to successful performance in those same trades.[20]

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[17] Ibid., p. 17

[18] U. S. Department of Labor Manual for the General Aptitude Test Battery, Section III, Development (Washington: U. S. Department of Labor, October, 1967), p. 58.

[19] William E. Stock and Frank C. Pratzner Review of Research on Student Selection and the Prediction of Success in Occupational Education (Minneapolis: Minnesota Research Coordination Unit in Occupational Education, University of Minnesota, August 1969), p. 34.

[20] Ibid., p. 38.

CHAPTER III

DESIGN OF THE STUDY AND POPULATION DESCRIPTION

This chapter will include a description of the population, the design of the follow-up study, and the methodology and design used to determine the relationship of test scores and training variables related to occupational persistence.

I. POPULATION DESCRIPTION

Questionnaires were sent to all of the eighty 1962-1966 Industrial Cooperative Training students who had terminated their training with this writer. Consisting of graduates and non-graduates, the population included students who had successfully completed one year of industrial cooperative training and had graduated from high school, those who had failed the industrial cooperative training program, and those who had withdrawn from the program sometime after completion of the first grading period. The seventy-seven students responding to the questionnaire had been placed in twenty-seven occupations established with fifty-seven businesses.

A Description of the James Wood Industrial Cooperative Training Program

The Industrial Cooperative Training Program at James Wood High School began in September of 1962. The writer served as the school's first industrial cooperative training coordinator until July of 1966.

The program was one of sixty-nine industrial cooperative training programs operating in the State of Virginia.[1] Virginia ranked third in a list of states with the greatest number of schools offering industrial cooperative training programs for high school students.[2]

Major curricular emphasis in the program was given to related, occupational classroom study. Approximately seventy percent of the students' industrial cooperative training classroom time was involved with supervised, related occupational study, and thirty percent was applied to generally related lessons taught by the writer. As a rule, instruction was provided in blocks of time rather than several blocks in a single day.

Participation in the co-curricular Diversified Occupations Clubs of Virginia was required of each student and was a part of the student's six-weeks grade. Club activities were conducted after school and on Saturdays. They consisted of meetings, athletics, money-making projects and contests and conventions.

Eighty percent of the 1962-1966 industrial cooperative training students who had terminated their training with this writer successfully completed the industrial cooperative training program and received high school diplomas. Two students had failed the program but graduated from James Wood High School, and fourteen students had withdrawn from school.

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[1] Preparatory Trade and Industrial Training Programs In Public Schools--A Directory: 1961-62, Office of Education, Bulletin O.E. 84028-62, cited by the Virginia Department of Education, "Informational Service Bulletin" No. 8 (Richmond: State Department of Education, 1963).

[2] Ibid.

II. DESIGN OF THE STUDY

Permission to use the industrial cooperative training personnel files was obtained from the school principal and the industrial cooperative training coordinator. The folders were selected for those students who had terminated their training while enrolled with the writer. Telephone contact was made to ascertain the correctness of addresses.

Design and Use of the Follow-Up Questionnaire

A follow-up questionnaire was designed and personal, hand-written letters were composed (see Appendix A-1 for a sample questionnaire). The questionnaire, letter and a self-addressed return envelope with postage were mailed to each student. Post cards were mailed and telephone calls were made in second, third and fourth attempts with those who did not respond to the first mailing.

The follow-up questionnaire used in the study was patterned from a form developed by Howard McVicker, Assistant Professor at Purdue University. Two Indiana forms were studied: the original Indiana Industrial Cooperative Training Follow-Up Information form, and a revised form, the Indiana Vocational Training Follow-Up Questionnaire. McVicker's questionnaire was developed as a result of sample follow-up forms requested from teacher trainers and state directors of vocational education. The revised form was made after the completion of an actual follow-up study conducted for an industrial cooperative training program in Indiana for the purpose of evaluating the questionnaire as an instrument.

Concerning the follow-up questionnaire used in this study, questions one, eight, nine, eleven, twelve, fourteen and fifteen were taken from

McVicker's questionnaire. Minor changes were made to reflect special needs of this paper and to eliminate information already on file. Question six, the expansion of question nine and questions sixteen through thirty-four were original questions designed for use in this study by the writer.

Data from Industrial Cooperative Training Personnel Folders

The following data contained in the personnel folders were summarized and examined for accuracy: The Kuder Preference Record test scores, the General Aptitude Test Battery job placement recommendations, employer ratings, daily work reports and self-study effort reports. Raw scores for the General Aptitude Test Battery were obtained from the Winchester Office of the Virginia Employment Commission.

A scale was developed for the employer ratings using the integers: one for a rating of poor, two for a satisfactory rating and three for a good rating. Total scores for each of the nine characteristics: appearance, promptness, cooperation, safety, interest in work, interest in firm, rate of work, quality of work and progress, rates by the student's employer were determined by adding the monthly ratings and dividing by the number of employer ratings contained in the personnel file. A similar score was determined for a total rating of all nine elements together (see Appendix A-2 for a sample form used to determine scores for students' employer ratings).

Daily work reports were examined for legitimate, related occupational training according to the definition given in the

Dictionary of Occupational Titles.[3] The students' occupational goals were recorded on a form used by the writer to separate related and unrelated occupational training experiences (see Appendix A-3 for sample form used to separate related and unrelated experiences). The job duties given in the definition located in the Dictionary of Occupational Titles were compared with the students' daily work experience reports. If the students' work experiences did not appear to fit the job duties described in the occupational definition, they were recorded as non-related. The total hours accumulated by each student, for one year only, were separated into related, trade and technical, occupational training hours, and non-related hours. The average hourly rate of pay and the average number of hours worked per week were also determined from the daily work reports. A total percentage of related, trade and technical, occupational training was determined by dividing the number of related occupational training hours by the total number of work experience hours accumulated.

It should be observed that the writer was not assessing the quality of the experience gained. It was assumed that all experiences were of equal value. It is possible that a lesser number of hours of related occupational training may be better than a greater number of related training hours. The writer was attempting to assess the meaning of the data as summarized in quantitative form. The amount of skilled training was being measured, but the level of skill obtained by the student was

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[3]U.S. Department of Labor Dictionary of Occupational Titles 1965 Volume I Definitions of Titles, Third Edition (Washington: U.S. Government Printing Office, 1965).

not considered. Justification for the writer's method of measuring the quantity of training was informally derived by consulting professional staff members of the Federal Aviation Administration located in Falls Church, Virginia, who, incidentally, had worked with the late Homer C. Rose, author of The Development and Supervision of Training Programs.[4] Their opinion was that a job analysis would provide a better measure, but that the approach used here was scholarly. It was assumed by the writer that most research workers could classify going for tools as an activity which is not related to occupational training. While the method used was not always quite that simple, in general, that was the kind of care taken by the writer in classifying work experiences as non-related.

The self-study effort reports were summarized quantitatively, by students, in terms of pages read and/or assignments completed in the two separate categories of directly related classroom studies and indirectly related classroom studies. Separate records were kept for the number of directly related references and indirectly related references used. This procedure was employed by the writer to obtain an indication of classroom motivation. It was assumed that all of the references, pages and assignments reported by the self-study effort reports were of equal difficulty. In addition, it was assumed that the students' reading abilities and reading interests were of equal range.

Final, first-year industrial cooperative training grades and raw scores for the Differential Aptitude Test were gathered from the school

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[4]Homer C. Rose The Development and Supervision of Training Programs (Chicago, Illinois: The American Technical Society, 1964).

guidance files. Industrial cooperative training grades were assigned scores of five for A, four for B, three for C, two for D and one of E.

Responses to the follow-up questionnaires were tabulated and analyzed in order to make a descriptive summary of the results which would provide evidence of the effectiveness of the present industrial cooperative training curriculum. In addition, the follow-up questionnaires were used to gather data for use in the multiple regression and correlation analysis.

Methodology Used to Predict Occupational Persistence

As discussed in the review of related literature, occupational persistence in industrial cooperative training job placements was selected as the criterion of success. The length of time that students remained in the occupation for which they were trained was taken from the follow-up questionnaires. Since the population consisted of the four successive classes from 1962 until 1966, a maximum of thirty-three months duration in the occupation for which the students were trained was set in order to equalize the opportunity to achieve occupational persistence.

The multiple prediction technique employed in this study involved a mathematical procedure whereby a combination of variables were used to increase the level of prediction. Ezekiel and Fox have pointed out the value of multiple prediction techniques as a useful means of prediction.[5]

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[5]Mordecai Ezekiel and Karl A. Fox Methods of Correlation and Regression Analysis (New York: John Wiley and Sons, Inc., 1961), pp. 434-458.

The predictor variables (independent) used in this study included interest and aptitude test scores and training related data collected during the period of the 1962-1966 James Wood High School Industrial Cooperative Training program (see Table IV, p. 37 for variables used).

The computational labor involved in handling the forty-nine variables used in the study required the use of automatic data processing equipment located at the University of Maryland in College Park, Maryland. An I.B.M. 7090 computer and a Biomedical Computer Program (BIMD 29) were used to process the data. The texts listed in the bibliography of this study, statisticians at the United States Department of Agriculture in Washington, D. C., vocational education research workers at the U.S. Office of Education in Washington, D.C., the Director of Research for Fairfax County Public Schools and the Graduate Committee Chairman for this writer were consulted during the analysis of the data.

CHAPTER IV

ANALYSIS OF THE DATA

The writer will make a descriptive summary of the student responses to the follow-up questionnaires, and present the results of the correlation analysis that was used to predict occupational persistence.

I. A DESCRIPTIVE SUMMARY OF THE FOLLOW-UP DATA

The results of the three to six year follow-up study of the 1962-1966, James Wood High School Industrial Cooperative Training Program includes the response to the questionnaire, a general description of the population, employment data and the value of the training received. Those students who successfully completed the program were designated as graduates and those who had failed or who had withdrawn from the program were designated as non-graduates. Those who were working in civilian jobs were designated as civilians and those who were serving in the armed forces were designated as military.

Response to the Questionnaire

95% of the eighty, former industrial cooperative training students completed the questionnaires. 76% responded following the first contact, 13% following the second contact, and 8% following the third. Two students responded to a fourth contact. The mean length of time required to receive all 76 of the responses following the first contact was twenty and eight tenths days.

A General Description

The median age of the former students in the study was twenty-two years. 59% were married. 71% were employed in civilian occupations, 25% were serving in the military service and 4% were housewives with children.

Their fathers' median age was fifty years. Their fathers' median educational level was seven and five tenths years. Their fathers' median hourly rate of pay was one dollar to one dollar and forty-nine cents higher than the former students' median hourly rate of pay range.

Military Status

Questions concerning military service were included on the questionnaire since it was a potential future occupation for the group that was 91% male.

65% had served or were serving in the military service, and 4% were rejected or had such a 4-F classification pending. 68% enlisted in the military service, 43% served in Vietnam, and 31% were in combat action.

68% held leadership positions either during their basic military training or after their basic training or during both periods of time, and 78% achieved sergeant-equivalent rank (specialists and non-commissioned officers). The median military service school grade achievement was B, and the median years served in the military was three years. 84% said that their experience in the military service was beneficial to them.

Sixteen of the graduates who had been in the armed forces (44%) had served in military occupations that were related to the training they received in industrial cooperative training. None of the non-graduates with armed forces experience had served in related military occupations.

Employment Status

None of the respondents were unemployed.[1] Only one respondent was employed part-time rather than full-time, and she was a housewife with children and she was not looking for full-time work. Six respondents were employed full-time at one job in addition to working one or more part-time jobs. Two respondents were self-employed. 81% of the respondents found employment immediately upon leaving the training program.[2] 9% found employment in less than one month.

71% of those respondents who were employed in civilian jobs were employed in the local Winchester City and Frederick County area. 73% of the graduates who were employed in civilian jobs were working in the local area, whereas 60% of the non-graduates were employed locally. 91% of the civilian job holders were employed in their home state of Virginia.

The review of literature presented in Chapter II of this study disclosed that the relation of follow-up employment to the occupations for which students were trained was usually used to indicate the

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[1]Does not include three housewives with children who were not seeking work.

[2]Does not include those who went directly into the military service.

effectiveness of industrial cooperative training programs. Table I shows that forty-four of the respondents (58%) were working in occupations related to the training they received in industrial cooperative training.

TABLE I

RELATIONSHIP OF PRESENT JOB TO OCCUPATIONAL TRAINING*

Year	Population	Same Occ.	Highly Related	Slightly Related	Totally Unrelated
1962-1963	15	4	3	2	6
1963-1964	14	3	2	2	7
1964-1965	25	7	3	3	12
1965-1966	22	6	2	7	7
Totals	76	20	10	14	32

*Includes graduates and non-graduates, civilians and military and non-working housewives.

Thirty of the respondents (40%) were still employed in the same or highly related occupation for which they were trained. Most of the former students changed occupations because of military service or to get higher pay (see Table II for the main reasons for changing occupations).

A search of the data revealed a possible explanation as to why one of the respondents, a left-handed meat cutter, was unable to find employment in the occupation for which he was trained. The respondent's employer rating disclosed that the employer was right-handed and that he

had difficulty teaching the student the manipulative skills, since all demonstrations were exactly opposite. A further inquiry of local chain stores revealed that a minimum height was required for the job and the respondent's height did not meet that requirement. No explanation was found for the other three respondents who said they were unable to find employment in the occupations for which they were trained.

TABLE II

MAIN REASON FOR CHANGING OCCUPATION
FOR WHICH TRAINED

Main Reason	Number of Respondents
Entered the military service	12
To get more money	12
Developed new interests	7
Marriage	5
Could not find employment	4
Dislike occupation for which trained	2
Apprenticeship was not available	2
Physical disability	1
Other (no reason given)	1
Total	46

Thirty-two of the graduates (73%) and five of the non-graduates (50%) who were employed in civilian jobs, were working in occupations that were related to their industrial cooperative training job placements.[3] The relationship of present civilian jobs to occupational training was:

	Group Size	Same Occ.	Highly Related	Slightly Related	Totally Unrelated
Graduates	44	17	6	9	12
Non-graduates	10	3	0	2	5
Totals	54	20	6	11	17

Job satisfaction is often used as a criterion of success. Most of the former students in this study were satisfied with their civilian employment, but over half of those who were in the military service were dissatisfied. 94% of those in civilian jobs were satisfied with their employment. One of the dissatisfied civilians was working in the same occupation for which he was trained, and two were working in totally unrelated occupations. Five of the seven former students who were serving in related military occupations were satisfied; whereas, eight of the twelve who were serving in unrelated military occupations were dissatisfied.

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[3] Does not include three non-working housewives with children who were not seeking work.

Hourly Rate of Pay, Not Including Military or Housewives with children

The median hourly rate of pay range for all students was two dollars and one cent to two dollars and fifty cents per hour. 24% of the population was earning over three dollars per hour. 31% of those who were working in occupations that were related to their industrial cooperative training were earning over two dollars and fifty cents per hour; whereas, only 13% of those who were working in unrelated occupations were earning over two dollars and fifty cents per hour.

Job Stability

The respondents made a mean of one and six tenths job changes, not including the military service as a change. The graduates made a mean of nine tenths job changes, and the non-graduates made a mean of four job changes.

The Effectiveness of the Industrial Cooperative Training Program

To provide jobs. Forty-one of the graduates (73%) and three of the non-graduates (23%) who did not go directly into the military service acquired their first full-time jobs as a result of their industrial cooperative training job placements. Eleven of the graduates (20%) and eight of the non-graduates (62%) acquired their first full-time jobs by direct application to employers. Four of the graduates (7%) and two of the non-graduates (16%) acquired their first full-time jobs as a result of the help of relatives or friends.

The industrial cooperative training job placements made by this writer provided the first full-time jobs for forty-four graduates and non-graduates (62%) who did not go directly into the military service.

To provide skills and knowledge. 66% of the respondents obtained most of the skills and technical knowledge needed in their first full-time job as a result of their industrial cooperative training. 17% received most of their skills and knowledge in a high school shop class or in some other non-industrial cooperative training class. 6% received most of their training in the armed forces. Another 6% received most of their training as a result of the training provided by an employer, and 5% received most of their training from their parents, in college or by general work experience.

The Effectiveness of the Industrial Cooperative Training Curriculum

". . . the primary purpose of curriculum evaluation is to give direction to future planning; to contribute favorable practices; and to eliminate or correct less desirable aspects of the existing program."[4] Responses to particular items on the follow-up questionnaire provided a qualitative, rank-order evaluation of the component parts of the industrial cooperative training curriculum to contribute to present job success.

The curricular activities were ranked relative to their value to present job success. The rank order given by those who were working in civilian occupations was:

1. On-the-job training experiences;
2. Directly related job studies;
3. Indirectly related job studies;

4.5 Generally related lessons;

4.5 Personal counseling and guidance;

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[4]John R. Wright (ed.) Secondary School Curriculum (Columbus, Ohio: Charles E. Merrill Books, Inc., 1963), p. 304.

6. Club participation.

The on-the-job training experiences were ranked first by 49% of the former students, and the directly related job studies were ranked second by 35% of the former students; whereas, the value of participation in club activities was ranked last by 62% of the former students.

Those students who were serving in the military service ranked the on-the-job training experiences first; the directly related job studies and generally related lessons tied for second; the indirectly related studies were rated fourth; personal counseling and guidance fifth and club activities sixth.

The Value of Directly Related Study and On-the-Job Training Experiences

The directly related study and the on-the-job training aspects of the curriculum were rated by the respondents as to the contribution made by each in helping the former students: (1) To work in their industrial cooperative training job placements; (2) to work in their present jobs; (3) to work in their military jobs; (4) to succeed in military schools and (5) to prepare for further education and training.

89% said the directly related classroom activity helped them a great deal or was some help in their industrial cooperative training job placement. 94% said the on-the-job training experiences helped them a great deal or was some help in their industrial cooperative training job placement.

77% said the directly related activity helped them a great deal or was some help in their present job. 80% said their on-the-job training experiences helped them a great deal or was some help in their present job.

46% said the directly related activity helped them a great deal or was some help in their military jobs. 50% said their on-the-job training experiences helped him a great deal or was some help in their military jobs.

48% said the directly related activity helped them a great deal or was some help in military schools. 42% said their on-the-job training experiences helped them a great deal or was some help in military schools.

83% said the directly related activity helped them a great deal or was some help in preparing for further education and training. 61% said their on-the-job training experiences helped them a great deal or was some help in preparing for further education.

Value of the Classroom Activities

The directly related self-study activity was ranked first by 72% of the respondents as being the most valuable in the achievement of industrial cooperative training job placement success. They rated the indirectly related activity second and the generally related lessons or personal counseling and guidance last.

Comparison of Industrial Cooperative Training With Military Service Schools

The ratings of the industrial cooperative training program in comparison to military service schools was about evenly distributed in the three categories; as many respondents rated their military service

schools as being better than I.C.T. as those who rated it the same as I.C.T. as those who rated it as not being as good as I.C.T.

Extension of Education and Training

34% of the population extended their training or education since leaving I.C.T. 15% of the population enrolled in an apprenticeship program. Seventeen respondents did not enroll in apprenticeship for reasons of marriage or because of the military service. Sixteen respondents were not sufficiently interested in apprenticeship. Fourteen respondents did not know where to enroll, thirteen reported that apprenticeship was not available for their occupation, and five were unable to attend apprenticeship classes.

A letter from the local apprenticeship director did not support the contention by the thirteen respondents who reported that apprenticeship was not available for their occupations. Apprenticeship classes were held in the local area for all of the occupation in which the thirteen respondents were trained as well as their present occupations.

Factors That Influenced the Selection of Occupations

The rank order of factors that influenced the selection of an occupation by the respondents while they were in high school was (1) someone in the occupation; (2) a strong interest in the occupation; (3.5) the industrial cooperative training coordinator; (3.5) job opportunities in the occupation; (5) the part-time employment opportunities for jobs in the occupation selected; (6) the students' parents; (7) an industrial cooperative training student; (8) a teacher, counselor or principal and (9) other high school students or neighbors.

II. THE RELATIONSHIP OF TEST SCORES AND TRAINING RELATED VARIABLES TO OCCUPATIONAL PERSISTENCE USING A MULTIPLE REGRESSION AND CORRELATION ANALYSIS

Three separate correlation cofficients were computed to illustrate the relationship of test scores and training related variables to occupational persistence. This procedure was necessary because data on some of the independent variables was missing for some of the students. The three correlation coefficients defined the relationship between:

1. The General Aptitude Test Battery and occupational persistence.
2. The Kuder Preference Record and Differential Aptitude Test Scores and occupational persistence.
3. Training related data and occupational persistence.

The subjects for the first two comparisons were grouped to form an occupational family of mechanical and building trades occupations (see Appendices A-7 and A-8, pp. 60-61 for a list of the specific occupations). Since interests and aptitudes were not used in the third comparison, it was not necessary to conform to an occupational family.

The Relationship of General Aptitude Test Battery Scores

The variables of the General Aptitude Test Battery used to predict occupational persistence were:

X_1 Intelligence (G)

X_2 Verbal Aptitude (V)

X_3 Numerical Aptitude (N)

X_4 Spatial Aptitude (S)

X_5 Form Perception (P)

X_6 Clerical Perception (Q)

X_7 Motor Coordination (K)

X_8 Finger Dexterity (F)

X_9 Manual Dexterity (M)

Y_1 Occupational Persistence (Criterion)

The Relationship of Kuder Preference Record Scores and Differential Aptitude Test Scores

The variables of the Kuder Preference Record and the Differential Aptitude Test used to predict occupational persistence were:

Kuder Preference Record

X_1 Outdoor Interest

X_2 Mechanical Interest

X_3 Computational Interest

X_4 Scientific Interest

X_5 Persuasive Interest

X_6 Artistic Interest

X_7 Literary Interest

X_8 Musical Interest

X_9 Social Service Interest

X_{10} Clerical Interest

Differential Aptitude Test

X_{11} Verbal Reasoning

X_{12} Numerical Ability

X_{13} Abstract Reasoning

X_{14} Space Relations

X_{15} Mechanical Reasoning

X_{16} Clerical Speed and Accuracy

Y_1 Occupational Persistence (Criterion)

The Relationship of Training Related Data

The training related variables used to predict occupational persistence were:

I.C.T. Classroom Study

X_1 Directly Related Study

X_2 Directly Related References

X_3 Indirectly Related Study

X_4 Indirectly Related References

X_5 Final I.C.T. Grade

On-The-Job Training

X_6 Percent Related Occupational Training

X_7 Hours of Related Occupational Training

X_8 Hours of Non-Related Training

X_9 Hourly Rate of Pay

Employer Rating

X_{10} Appearance

X_{11} Promptness

X_{12} Cooperation

X_{13} Safety

X_{14} Interest in Work

X_{15} Interest in Firm

X_{16} Rate of Work

X_{17} Quality of Work

X_{18} Progress

X_{19} Total Employer Rating

Y_1 Occupational Persistence (Criterion)

Results of the Multiple Regression and Correlation Analysis

The correlation coefficient between the General Aptitude Test Battery scores and occupational persistence, and the correlation coefficient between the training related variables and occupational persistence were significant at the .05 level. The correlation coefficient between the Kuder interest and Differential Aptitude Test scores and occupational persistence was significant at the .01 level.

A summary of the relationship is shown in Table III.

TABLE III

CORRELATION COEFFICIENTS AND THE AMOUNT OF VARIANCE COMPUTED TO ILLUSTRATE THE RELATIONSHIP OF TEST SCORES AND TRAINING RELATED VARIABLES TO THE CRITERION, OCCUPATIONAL PERSISTENCE

GATB SCORES	KUDER-DAT SCORES	TRAINING RELATED DATA
R = .66	R = .53	R = .40
R^2= .44	R^2= .29	R^2= .19
N = 29	N = 37	N = 38

The best combination of test scores and training related data (independent variables) that were related to occupational persistence (dependent variable) are shown in Table IV. The minus signs for some of the variables indicate a negative relationship with the criterion. For a more detailed analysis of the results, see the correlation matrix tables in Appendices A-4, A-5 and A-6 on pages 57 through 59.

TABLE IV

TEST SCORES AND TRAINING RELATED DATA
RELATED TO OCCUPATIONAL PERSISTENCE*

GATB SCORES	KUDER-DAT SCORES	TRAINING RELATED DATA
Form Perception (-)	Clerical Aptitude (-)	Non-Training Hours (-)
Clerical Perception	Computational Interest	Interest in Firm
Finger Dexterity	Mechanical Interest	Cooperation
Numerical Aptitude	Scientific Interest (-)	
Spatial Aptitude (-)		
Motor Coordination (-)		

*See Table III, p. 36 for the correlation coefficients.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Some conclusions and recommendations, based on the analysis of the follow-up questionnaires and the multiple regression are presented in this chapter.

I. CONCLUSIONS BASED ON THE FOLLOW-UP QUESTIONNAIRES

The ninety-five percent return of the questionnaires used in this study indicated that information may be obtained by the use of this research tool in spite of its length. This should be especially true when respondents know the research worker or have some common bond of attachment to the training program.

Based on an analysis of the follow-up data, the respondents indicated the following tendencies:

1. They were satisfied with their present jobs.
2. They were employed in the local community.
3. They were employed in occupations that were related to their I.C.T. training.
4. They earned over two dollars and fifty cents per hour when they were employed in occupations that were related to their I.C.T training, more often than when they were employed in occupations that were not related to their I.C.T. training.
5. They made fewer job changes if they were graduates than if they were non-graduates.

6. They made job changes because of military service and in order to get higher pay.
7. They acquired their first full-time job as a result of their I.C.T. job placement.
8. They acquired most of the skills and technical knowledge needed for their first full-time job as a result of their I.C.T. training.
9. They selected occupations as a result of the influence of persons working in the occupation.
10. They supported an industrial cooperative training curriculum that emphasizes on-the-job training first, directly related second, indirectly related third, generally related and counseling fourth and club activities last.
11. They rated the value of club activities last in their contributions to later success.
12. They enlisted in the armed forces.
13. They attained leadership positions in the military service.
14. They achieved a grade of B in military service schools.
15. They rated their military service as a beneficial experience.
16. They were more often satisfied with military jobs if they were graduates than if they were non-graduates.
17. They served in related military jobs if they were graduates and they served in unrelated jobs if they were non-graduates.

Based on an analysis of the follow-up data, the respondents indicated the following negative tendencies:

1. They did not extend their education and training.

2. They did not enroll in apprenticeship training.

3. They were not satisfied with their military jobs.

A significant result of this study was that seventy-three percent of the civilian graduates were working in related occupations three to six years following graduation. The national follow-up of all secondary preparatory vocational education programs reported that seventy-six percent of those persons available for placement (non-military, etc.) were placed in related occupations four months following completion of training.[1] This comparison of occupational relatedness forcefully describes the effectiveness of industrial cooperative training to complement the post-training status of former students over a longer period of time.

This study provided some evidence of the effectiveness of the directly related classroom activity and of the on-the-job training aspects of the industrial cooperative training curriculum to complement post-training status. Eighty percent of the respondents reported that the on-the-job training experiences were helpful in their follow-up jobs. Seventy-seven percent of the respondents reported that the directly related activity was helpful in their follow-up jobs. These percentages were derived from a ninety-five percent response to the follow-up questionnaires.

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[1]U. S. Office of Education, Division of Vocational and Technical Education Vocational Education Annual Report, Fiscal Year 1967 (Washington: Government Printing Office, 1969).

II. CONCLUSIONS BASED ON TEST SCORES AND TRAINING DATA RELATED TO OCCUPATIONAL PERSISTENCE

The study suggests that the prediction of occupational persistence as measured by the number of months employed in the occupation for which trained can be predicted by the General Aptitude Test Battery, the Kuder Preference Record, the Differential Aptitude Test and training related variables.

The Correlation of General Aptitude Test Battery Scores to Occupational Persistence in Mechanical and Building Trades Occupations

The test scores of the General Aptitude Test Battery that were related to the criterion, occupational persistence, with an R = .66 at the .05 level, were:

1. (P) Form perception (Negative relationship)
2. (Q) Clerical perception (Positive relationship)
3. (F) Finger dexterity (Positive relationship)
4. (N) Numerical aptitude (Positive relationship)
5. (S) Spatial aptitude (Negative relationship)
6. (K) Motor coordination (Negative relationship)

The inclusion of clerical perception (Q) and numerical aptitude (N) test scores was consistent with those obtained in the study made by Pucel.[2] Since Pucel did not have sufficient data for the form perception (P), motor coordination (K), finger dexterity (F) and manual dexterity (M) tests, they were not included in his equation.

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[2]David J. Pucel Variables Related to MDTA Trainee Employment Success In Minnesota (Washington: U.S. Office of Education, February, 1968) p. 14.

The Correlation of Kuder Preference Record and Differential Aptitude Test Scores to Occupational Persistence in Mechanical and Building Trades Occupations

The best combination of Kuder Preference Record and Differential Aptitude Test scores that were related to the criterion, occupational persistence, with an R = .53 at the .01 level, were:

1. (DAT) Clerical speed and accuracy (Negative relationship)
2. (KUDER) Computational interest (Positive relationship)
3. (KUDER) Mechanical interest (Positive relationship)
4. (KUDER) Scientific interest (Negative relationship)

Possible Reasons to Explain the Apparent Contradiction Between the Negative Clerical Speed and Accuracy Scores (DAT) and the Positive Clerical Perception Scores (GATB)

A comparison of the two multiple regression equations showed that a positive clerical aptitude was associated with the General Aptitude Test Battery equation, but that a negative clerical aptitude was associated with the Differential Aptitude Test equation. An inspection of the Differential Aptitude Test manual revealed that the clerical speed and accuracy test (CSA) had a correlation of .46 with the form perception (P) test of the General Aptitude Test Battery.[3] The General Aptitude Test Battery manual reported correlations ranging from .43 to .59 between the (CSA) and the (P) tests.[4] Furthermore, the form perception test (P) consists of tool matching and form matching.[5] The clerical speed

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[3]George K. Bennett, Harold G. Seashore and Alexander G. Wesman Differential Aptitude Tests Fourth Edition Manual Forms L and M (New York: The Psychological Corporation, 1966) p. A-15.

[4]U. S. Department of Labor Manual for the General Aptitude Test Battery Section III Development (Washington: U.S. Department of Labor, October, 1967) pp. 182-183.

[5]Ibid., pp. 13-15.

and accuracy test (CSA) measures essentially the same kind of perception using letters and numbers.[6] The writer suggests that the clerical speed and accuracy test (CSA) of the Differential Aptitude Test may actually be a measure of form perception. Therefore, it would not be unreasonable for the Differential Aptitude Test of clerical speed and accuracy to assume the same negative direction as the form perception test (P) of the General Aptitude Test Battery.

Training Related Data Associated with Occupational Persistence

For the dependent variable, occupational persistence, the multiple R of .40 was significant at the .05 level. The equation indicated that the on-the-job training aspect of industrial cooperative training was most often associated with retaining students in the occupations for which they were trained. The best variables were:

1. Fewer hours of unrelated occupational training (Negative)
2. Higher employer ratings on the "interest in Firm" scale (Positive)
3. Higher employer ratings on the "cooperation" scale (Positive)

Of additional interest was the correlation matrix showing the relationship of variables with directly related study. The higher correlations were:

1. Percent of related occupational training r = .79
2. Appearance (employer rating) r = .78
3. Hours of related occupational training r = .76
4. Cooperation (employer rating) r = -.72
5. Interest in work (employer rating) r = .70

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[6] Bennett, op.cit., Chapter 1, pp. 7-8.

It is also of interest to note that directly related study and I.C.T. grades were the fourth and fifth most important variables in the relationship to occupational persistence. However, they were not significant at the .05 level.

This study suggests that the nature of occupational persistence involves the consideration of many factors. Some of these factors concerning occupational placement, on-the-job training and classroom effort have been analyzed in this study. The factors are not simple ones. The simple correlations with the criterion were low. The size of the sample was small, and the relatively small amount of variance in the criterion did not imply precise relationships. There was some controversy concerning the use of a multiple regression as the writer has applied it to the study. The writer concludes that insight has been gained. The writer leaves the theoretical implications of the statistical procedure to mathematicians.

III. RECOMMENDATIONS

Based on the conclusion of this study, the following recommendations are made:

1. The results of the study are offered to teachers and to supervisors of industrial cooperative training programs to assist them in designing research studies that will make better use of the statistical data currently being collected.

2. The writer recommends that a Virginia follow-up questionnaire be developed using the design of the Indiana Follow-Up Report and the questionnaire used in this study.

3. The writer recommends that summaries of daily work reports and employer ratings be collected by the state department of vocational industrial education and that the data be used in a computer program for the evaluation of the job training being provided.

4. The writer recommends that the on-the-job training aspect of industrial cooperative training be of major concern.

5. The writer recommends that a research study be made to determine the value of club activities in the industrial cooperative training curriculum.

6. The writer recommends that the membership of advisory committees for industrial cooperative training programs include craftsmen who are working in trade and technical occupations. Persons in the occupations provided the most influence in the selection of occupations by students in this study. Such advisory committee membership may help to recruit students for industrial cooperative training occupations.

APPENDIX

SAMPLE FORM

INDUSTRIAL COOPERATIVE TRAINING FOLLOW-UP QUESTIONNAIRE

1. Name _____ Age _____

   Address _____

   Phone _____ Maiden Name _____

   Marital Status: __Married __Divorced __Separated __Widowed __Single

2. What is your present job title or classification? _____

3. Is your present occupation related to the ICT training you received?

   ___Same occupation ___Slightly related

   ___Highly related ___Totally unrelated

   If present employment is slightly or totally unrelated, give main reason for changing.

   ___Could not find employment ___Developed new interests

   ___Disliked occupation for which trained ___Never intended to follow the occupation

   ___Apprenticeship was not available ___This work pays better

   ___Marriage ___Other (specify)_____

4. How long have you worked for your present employer? __Years __Months

5. Please indicate the degree of satisfaction of your present employment:

   __Satisfied __Mildly satisfied __Mildly dissatisfied __Dissatisfied

6. What is your present hourly rate of pay, including commission? (FULL-TIME work only)

   ___Presently in military ___2.01 to 2.50 ___4.01 to 4.50

   ___Under $1.00 per hour ___2.51 to 3.00 ___4.51 to 5.00

   ___1.01 to 1.50 ___3.01 to 3.50 ___5.01 to 5.50

   ___1.51 to 2.00 ___3.51 to 4.00 ___5.51 to 6.00

   ___Over $6.00 per hour

Note: When figuring hourly rate including commission; divide average monthly commission by 4 (weeks). Divide result by hours worked per week, and add to guaranteed hourly rate.

Example:			
	average monthly commission	$40.00 ÷ 4 =	$10.00
	$10.00 ÷ 40 hours per week	=	.25
	guaranteed hourly rate of pay		2.00
	add		.25
	hourly rate including commission		$ 2.25

If not on hourly rate, please give approximate yearly salary _____

7. Which statement(s) below most accurately describe(s) your present employment status?

___Self-employed

___Full-time employment (over 35 hours per week)

___Full-time employment at one job and hold one or more part-time jobs

___Part-time employment (less than 35 hours per week) and looking for full-time work

___Part-time employment and not looking for full-time work (Reason)_____

___Not employed but looking for work

___Not employed and not looking for work (Reason) _____

___Military

8. How long since leaving ICT, have you worked in the occupation for which trained in ICT?

___Years ___Months

9. How many different employers have you worked for since leaving ICT? __

Please list as much of the following information as possible:

Approximate Dates from	to	Job Title	Employer	Address	Main Reason For Leaving
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

(Use back side of this sheet, if necessary)

*For each job, select one letter from the following list of Reasons for Leaving:

Letters

a-Laid-off

b-Dismissed

c-Not enough pay

d-Not enough hours

e-Not receiving enough training

f-Lacked opportunity for advancement

g-Unsuitable employer-employee relations

h-Unsuited to this occupation

i-Unsuitable area (geographic)

j-Military service

K-Marriage or pregnancy

l-Illness or injury

m-College or other schooling

10. How long after leaving high school did you begin your first FULL-TIME job?

___No waiting period

___Less than one month

___One to two months

___Two to three months

___Three to six months

___Marriage

___Military

___Other (specify _____
_____

11. How did you acquire your first full-time job?

___Result of ICT placement

___High school or college placement

___State employment service

___Direct application to employer

___Relative or friend

___Union business agent

___Previous employer

___Previous teacher(s)

___School counselor

___Other (specify)_____

12. Where did you obtain most of the skills and technical knowledge needed in your first FULL-TIME job?

___High School ICT program

___High School shop or class

___Armed Forces

___Other (specify)

13. What phases of your first FULL-TIME job were you least prepared for after completing ICT? (Rank in order by placing a "1" beside phase least prepared for, a "2" for phase second least prepared for, a "3" for third, and 4, 5, 6, 7.)

___Lacked sufficient practical experience

___Needed additional technical training

___Had difficulty in adjusting to physical working conditions

___Lacked basic math related to job

___Lacked basic science related to job

___Lacked communication skills (writing and speaking) related to job

___Other (specify) _____

14. Listed below are some of the ways individuals are influenced in selecting an occupation. Rank the <u>three</u> that influenced your occupational choice while in high school. (Rank in order of influence, i.e., 1, 2, 3.)

___Books and magazines

___Parents

___Relatives

___Neighbors (adult)

___ICT student

___Job opportunities

___Fellow students

___Part-time employment

___Teacher,counselor or principal

___ICT Coordinator

___Someone in the occupation

___Other (specify) _____

15. Other education or training beyond high school. (Mark all that apply)

___Vocational-technical school (area of study) _____

___Correspondence (course) (area of study) _____

___Apprenticeship (area of study) _____

___College (circle highest year completed: (1 2 3 4 5 6) (area of study).

Military Status

16. What is your present selective service classification? _____

17. Check each of the following that apply to you:

___Presently on active duty in armed forces

___Presently in ACTIVE reserves (attendance required)

___Presently in national guard

___Have served in national guard

___Have served on active duty

___Drafted

___Have served in ACTIVE reserves

___Enlisted

___Served in combat action

___Served in Vietnam

18. Please provide the following information:

a-Branch of service _____

b-Leadership positions held while in basic training _____

_____

c-Leadership positions held, other than basic training, while in military _____

d-Highest military rank achieved _____

e-Military M.O.S. (job titles) _____

f-Years served in military or intend to serve _____

19. List service schools attended and give actual or approximate grade achievement:

Service Schools	Grade (A,B,C,D,E)	Approximate Class size
_____	_____	_____
_____	_____	_____
_____	_____	_____

20. Do you feel the military service was beneficial to you? __Yes __No

Why? _____

21. How would you rate (compare) your military service school(s) with your ICT training?

___Better than ICT training ___Same as ICT training ___Not as good as ICT training

22. How long after leaving the military service did you begin your first job?

___No waiting period ___Two to three months

___Less than one month ___Three to six months

___One to two months ___Other (specify) _____

23. Rank the three high school courses below that you feel were of most use to you since leaving high school: (Rank in order of usefulness, i.e., 1, 2, 3).

___English ___Math ___Music

___History ___Science ___Physical education

___Government ___Industrial arts ___I.C.T.

___Agriculture ___Mechanical drawing ___Other (specify) _____

24. Compare the value gained from your ICT, directly related classroom studies (job textbooks, etc.) with the value gained from your ICT job experiences in helping you:

	Great Deal		Some		Little or None		Not Certain	
	ICT Class	ICT Job	ICT Class	ICT Job	ICT Class	ICT Job	ICT Class	ICT Job
To do on-the-job work (ICT Job)								
To do on-the-job work (Present Job)								
To do on-the-job work (Military)								
To succeed in military schools								
To prepare for further education (apprenticeship, college, short courses, trade schools etc.)								

25. What parts of your ICT training were of most value to your present job success (performance)? (Rank in order of value, i.e., place a "1" beside part most valuable, a "2" for second most valuable, etc. Rank in 1-2-3-4-5-6 order.)

___Directly Related job studies

___Indirectly Related studies (math, science, physics, etc., as related to job)

___Generally Related lessons taught by Coordinator

___Club participation (contests, meetings, etc.)

___Personal counseling and guidance

___ICT Job experience

26. What parts of your ICT training were of most value to your ICT job success? (Rank in 1-2-3-4-5 order)

___Directly Related job studies

___Indirectly Related studies (math, science, physics, etc., related to job).

___Generally Related lessons taught by Coordinator

___Personal counseling and guidance

27. If you have never enrolled in formal apprenticeship, please check reasons why not:

___Apprenticeship not available for my occupation

___Did not know where to enroll

___Not interested in Apprenticeship (sufficiently)

___Unable to attend classes (Reasons)_____

___Other (specify) _____

28. What are your hobbies? _____

29. Have you attended any banquets since leaving high school? __Yes __No

30. Do you attend dances? __Yes __No

31. Do you attend parties? __Yes __No

32. Circle highest number of years of schooling your father completed:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

33. What is your father's occupation?_____Age ___

34. What is your father's approximate, present hourly rate of pay, including commission? (If on commission, refer to question #6 for method.)

___Unemployed

___Retired

___Under $1.00 per hour

___1.01 to 1.50

___1.51 to 2.00

___2.01 to 2.50

___2.51 to 3.00

___3.01 to 3.50

___3.51 to 4.00

___4.01 to 4.50

___4.51 to 5.00

___5.01 to 5.50

___5.51 to 6.00

___Over $6.00 per hour

Note: If not on hourly rate, please check yearly income range below:

___Under $5,000 per year

___Over 5,000 but less than 6,000

___Over 6,000 but less than 7,000

___Over 7,000 but less than 8,000

___Over 8,000 but less than 9,000

___Over 9,000 but less than 10,000

___Over 10,000 but less than 11,000

___Over 11,000 per year

SAMPLE FORM USED TO OBTAIN SCORES FOR
STUDENTS' EMPLOYER RATINGS

EMPLOYER RATINGS*

Name John Jones

	SCORES									
Characteristics	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	ICT I Rating
APPEARANCE	2	2	2	3	3	2	3	3	3	2.62
PROMPTNESS	3	3	3	3	3	3	3	3	3	3.00
COOPERATION	2	2	2	2	2	2	2	2	2	2.00
SAFETY	3	3	3	3	3	3	3	3	3	3.00
INTEREST IN WORK	3	3	3	2	2	2	1	1	1	2.00
INTEREST IN FIRM	3	2	2	2	1	1	2	2	1	1.77
RATE OF WORK	3	3	2	2	2	2	2	2	2	2.22
QUALITY OF WORK	2	2	2	3	3	2	3	3	3	2.62
PROGRESS	1	1	2	2	3	3	3	3	3	2.33
TOTAL MONTHLY RATING	2.44	2.33	2.33	2.44	2.44	2.22	2.44	2.44	2.33	21.56

RATING SCALE

Good = 3.00

Satisfactory = 2.00

Poor = 1.00

*Scores were determined by adding monthly rating scores and dividing by the number of ratings made.

SAMPLE FORM

SUMMARY OF ON-THE-JOB OCCUPATIONAL TRAINING EXPERIENCES

Name _____

I.C.T. Occupational Goal Auto Body Repairman

"Repairs damaged bodies and body parts of automotive vehicles, such as automobiles and light trucks: Examines damaged vehicles and estimates cost of repairs. Removes upholstery, accessories, electrical and hydraulic window-and-seat operating equipment, and trim to gain access to vehicle body and fenders. Places dolly block against surface of dented area and beats opposite surface with hammer to remove dents. Fills depressions with solder or other plastic material. Removes excessively damaged fenders, panels, and grills, using wrenches and cutting torch, and attaches replacements by bolting or welding them in position. Straightens bent frames, using hydraulic jack and pulling device. Files, grinds and sands repaired surfaces, using power tools and hand-tools. Refinishes repaired surface by painting with primer coat and sanding it smooth. Alines headlights, alines wheels, and bleeds hydraulic brake system. May paint surfaces after performing body repairs . . ."[1]

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[1]U. S. Department of Labor Dictionary of Occupational Titles, 1965, Volume I Definitions of Titles, Third Edition (Washington: U. S. Government Printing Office, 1965), p. 32.

Cont'd

On-the-job Occupational Training Experiences

RELATED OCCUPATIONAL EXPERIENCES, skilled training experiences, experiences related to the D.O.T. definition of this occupation.	ICT I HOURS
Spray Painting	50
Removing dents	100
Assemble and disassemble body parts	75
Sanding	100
Filling depressions with fiber glass	25
Using a cutting torch	10
Taping	40
TOTAL HOURS OF RELATED OCCUPATIONAL EXPERIENCES	400

NON-RELATED OCCUPATIONAL EXPERIENCES, non-skilled and/or unrelated work experiences.	ICT I HOURS
Washing cars	40
Changing tires	30
Running Errands	30
Sweeping shop floor	50
TOTAL HOURS OF NON-RELATED OCCUPATIONAL EXPERIENCES	150

Percentage of Related Occupational Experience was determined by dividing the total hours of Related Occupational Experiences by the total number of hours worked.

PERCENTAGE OF RELATED OCCUPATIONAL EXPERIENCE = 72.7%

TABLE V

PRODUCT-MOMENT CORRELATION COEFFICIENT FOR THE DETERMINATION OF OCCUPATIONAL PERSISTENCE USING NINE GENERAL APTITUDE TEST BATTERY SCORES

Variable Number	Y_1	(G) X_1	(V) X_2	(N) X_3	(S) X_4	(P) X_5	(Q) X_6	(K) X_7	(F) X_8	(M) X_9
Y_1 (Criterion)		.037	.179	.292	-.153	-.294	.152	-.259	.227	-.042
X_1 (G) Intelligence			.757	.758	.863	.061	.032	.084	.070	-.051
X_2 (V) Verbal Aptitude				.533	.548	-.157	-.013	.012	.086	.135
X_3 (N) Numerical Aptitude					.471	.114	.388	.223	-.067	-.182
X_4 (S) Spatial Aptitude						.093	-.187	.064	.127	.025
X_5 (P) Form Perception							.472	.477	.082	.140
X_6 (Q) Clerical Perception								.381	-.122	-.000
X_7 (K) Motor Coordination									-.203	.159
X_8 (F) Finger Dexterity										.160
X_9 (M) Manual Dexterity										

TABLE VI

PRODUCT-MOMENT CORRELATION COEFFICIENT FOR THE DETERMINATION OF OCCUPATIONAL PERSISTENCE USING SIXTEEN KUDER PREFERENCE RECORD AND DIFFERENTIAL APTITUDE TEST SCORES

Variable Number	Y_1	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}
Y_1 (Crit.)		.127	.081	.216	-.143	.104	-.020	-.030	.035	-.056	.024	-.053	-.034	-.085	-.127	.089	-.283
X_1 Outdoor			.751	.216	.340	-.003	.157	.085	-.236	.306	.005	.248	.317	.252	.385	.585	.283
X_2 Mechanical				.281	.442	.387	.451	.251	-.100	.325	.123	.321	.196	.209	.174	.515	.426
X_3 Computational					.458	.312	.205	.179	.147	.352	.745	.186	.128	.101	.118	.233	.398
X_4 Scientific						.387	.282	.380	.138	.532	.389	.285	.162	.164	.230	.461	.425
X_5 Persuasive							.631	.552	.279	.495	.441	.152	.044	-.063	-.171	-.017	.372
X_6 Artistic								.173	.130	.251	.146	-.070	.056	-.124	-.226	.049	.467
X_7 Literary									.273	.247	.252	.224	.127	.031	.128	.064	.264
X_8 Musical										.340	.244	.083	.126	-.045	.037	.008	.227
X_9 Social Service											.277	.054	.111	.102	.230	.172	.394
X_{10} Clerical												.218	.138	.113	-.028	-.005	.355
X_{11} Verbal Reasoning Aptitude													.396	.403	.562	.614	.290
X_{12} Numerical Ability Aptitude														.374	.616	.457	.403
X_{13} Abstract Reasoning Aptitude															.416	.465	.437
X_{14} Space Relations Aptitude																.614	.390
X_{15} Mechanical Aptitude																	.355
X_{16} Clerical Speed and Accuracy Aptitude																	

TABLE VII

PRODUCT-MOMENT CORRELATION COEFFICIENT FOR THE DETERMINATION OF OCCUPATIONAL PERSISTENCE USING NINETEEN TRAINING RELATED VARIABLES

Variable Number	Y_1	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}
Y_1 (Crit)		-.166	-.158	-.175	-.195	.268	-.064	-.170	-.291	-.184	-.096	.247	.169	.188	-.023	.203	.201	.157	.176	.204
X_1 D.R. Study			.654	.868	.864	.107	.797	.767	.702	.638	.781	-.643	-.720	-.539	.707	.093	.159	.090	.073	.110
X_2 D.R. References				.697	.740	.027	.666	.551	.479	.541	.671	-.661	-.529	-.430	.379	-.051	-.020	-.110	.103	.069
X_3 I.R. Study					.924	.003	.850	.798	.793	.704	.810	-.725	-.704	-.529	.758	.153	.128	.108	.030	.124
X_4 I.R. References						.143	.950	.883	.786	.822	.830	-.807	-.780	-.620	.763	.032	.093	.065	.038	.054
X_5 I.C.T. Final Grade							-.121	-.166	-.325	-.252	.127	.459	.353	.423	.180	.578	.484	.327	.278	.580
X_6 % Related Occupational Training								.910	.677	.801	.797	-.732	-.745	-.597	.798	.038	.082	.084	.029	.080
X_7 Hours of Related Occupational Training									.789	.750	.762	-.714	-.715	.646	.716	.056	.055	.063	.030	.042
X_8 Hours of Unrelated Training										.648	.638	-.787	-.753	-.617	.514	-.024	-.061	-.049	-.126	-.133
X_9 Hourly Rate of Pay (while in I.C.T.)											.669	-.699	-.661	-.585	.638	-.033	.045	.094	.018	.010
X_{10} Appearance												-.607	-.495	-.357	.688	.343	.297	.161	.166	.333
X_{11} Promptness													.778	.674	-.318	.367	.233	.181	.256	.376
X_{12} Cooperation														.812	-.485	.348	.210	.241	.068	.362
X_{13} Safety															-.280	.455	.330	.435	.145	.524
X_{14} Interest in Work																.471	.410	.377	.353	.516
X_{15} Interest in Firm																	.692	.569	.504	.893
X_{16} Rate of Work																		.772	.636	.854
X_{17} Quality of Work																			.569	.801
X_{18} Progress																				.677
X_{19} Total Employer Rating																				

TABLE VIII

SPECIFIC OCCUPATIONS USED TO FORM THE MECHANICAL AND BUILDING TRADES OCCUPATIONAL FAMILY FOR THE DETERMINATION OF GENERAL APTITUDE TEST BATTERY SCORES RELATED TO OCCUPATIONAL PERSISTENCE

Specific Occupations	Number of Students
Auto Mechanic	8
Truck Mechanic	1
Tractor Mechanic	2
Production Mechanic (Maintenance)	1
Typewriter Mechanic	1
Refrigeration Mechanic	1
Electric Motor Mechanic (Repairman)	1
Dental Mechanic (Laboratory Technician)	1
Radio and Television Mechanic (Repairman)	1
Machinist	1
Meat Cutter	1
Bricklayer	1
Carpenter	3
Cabinetmaker	2
Electician	3
Plumber	1
TOTAL	N = 29

TABLE IX

SPECIFIC OCCUPATIONS USED TO FORM THE MECHANICAL AND BUILDING TRADES OCCUPATIONAL FAMILY FOR THE DETERMINATION OF KUDER INTEREST AND DIFFERENTIAL APTITUDE TEST SCORES RELATED TO OCCUPATIONAL PERSISTENCE

Specific Occupations	Number of Students
Aircraft Mechanic	1
Auto Mechanic	8
Truck Mechanic	2
Tractor Mechanic	4
Production Mechanic (Maintenance)	2
Typewriter Mechanic	1
Electric Motor Mechanic (Repairman)	1
Dental Mechanic (Laboratory Technician)	1
Radio and Television Mechanic (Repairman)	1
Scale Mechanic	1
Loom Mechanic (Fixer)	1
Auto Body Mechanic (Repairman)	2
Carpenter	4
Cabinetmaker	3
Electrician	4
Plumber	1
TOTAL	N = 37

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VITA

The youngest of three children, Glenn Oliver Workman was born in Frostburg, Maryland, December 23, 1933, to Jabez B. and Elsie (Hott) Workman. He was graduated from Beall High School in 1951 after attending Beall Elementary School in Frostburg. In 1959 he was graduated from the University of Maryland in College Park, Maryland, with a Bachelor of Science Degree in agriculture. He later completed the educational requirements for a Collegiate Professional Teaching Certificate in biology, science and industrial cooperative training.

He taught in the Virginia public schools for ten years, seven of those years at James Wood High School in Winchester, and three years at W. T. Woodson High School in Fairfax. His teaching experience has included biology, science, industrial arts, mechanical drawing, and industrial cooperative training. His extra-curricular educational experience has included coaching football and track, sponsor of the junior and senior classes, and school advisor for the Vocational Industrial Clubs of America. In educational administration, he served as an adult vocational education coordinator for the Fairfax County public schools.

He is a member of the Fairfax Education Association, the Virginia Education Association, and the National Education Association. He has served as District Chairman of the Vocational Industrial Clubs of America, and as President of the Industrial Cooperative Training Coordinators of Northern Virginia.

He is married to the former Joan Duvall from Marlboro, Maryland and has a son, Jeremy.

Glenn O. Workman

GLENN O. WORKMAN